

Title Antioxidant phytochemical and quality changes associated with hot water immersion treatment of mangoes (*Mangifera indica* L.)

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Abstract

Mangoes are an important tropical fruit crop worldwide and are best noted for their vibrant flesh colour, juicy texture, and sweet flavour, along with important nutrient contributions from their phytochemical constituents. Mangoes imported to the US must be exposed to thermal quarantine treatments, such as irradiation and hot water treatment (HWT), to eradicate invasive pests, yet limited data exist regarding polyphenolic changes to the fruit following hot water immersion treatment. Although the water temperature remains constant, the duration of treatment depends on fruit size. Therefore, these investigations focused on polyphenolic and antioxidant changes to mature, green mangoes following varying times of HWT and their changes during short-term storage. Experimentally, fruit were immersed in 46.1 °C water from 70 to 110 min; half evaluated within 2 h of treatment, while the remainder was evaluated after 4 days of storage at 25 °C for changes in polyphenolics, antioxidant capacity and fruit quality. Free gallic acid and four gallotannins were tentatively identified as the major polyphenolics present by HPLC analysis against authentic standards. Two major polyphenolics in mango, gallic acid and gallotannins, as well as total soluble phenolics, decreased as a result of prolonged HWT, while the antioxidant capacity remained unchanged in all heat-treated mangoes immediately after HWT. However, during 4 days storage, only minor changes were observed in gallic acid and gallotannin concentrations whereas total soluble phenolics and antioxidant capacity in all hot water-treated fruits decreased. The optimum hot water immersion times did not affect the external quality and polyphenolics of mangoes but all heat treatments reduced total soluble phenolics and antioxidant capacity, regardless of the duration of treatment times, during 4 days storage.